CLAIMS

Listing of Claims:

1. (Original) In a wireless multiple-input multiple-output (MIMO) communication system, a method of deriving a matched filter based on a steered reference, comprising:

obtaining a plurality of sets of received symbols for the steered reference received via a first link and generated based on a plurality of steering vectors; and

deriving the matched filter based on the plurality of sets of received symbols, wherein the matched filter includes a plurality of eigenvectors corresponding to the plurality of steering vectors.

2. (Original) The method of claim 1, wherein each of the plurality of sets of received symbols is for a steered reference symbol generated based on one of the plurality of steering vectors.

3. (Original) The method of claim 1, wherein the plurality of eigenvectors of the matched filter are orthogonal to one another.

4. (Original) The method of claim 3, wherein the plurality of eigenvectors of the matched filter are orthogonalized using QR factorization.

5. (Original) The method of claim 4, further comprising:

estimating gains associated with the plurality of steering vectors based on the plurality of sets of received symbols; and

ordering the plurality of eigenvectors based on the estimated gains.

6. (Original) The method of claim 3, wherein the plurality of eigenvectors of the matched filter are orthogonalized using minimum square error computation.

7. (Original) The method of claim 3, wherein the plurality of eigenvectors of the matched filter are orthogonalized using polar decomposition.

8. (Original) The method of claim 1, wherein the steered reference is received over multiple frames.

9. (Original) The method of claim 1, further comprising:

performing matched filtering of a data transmission received via the first link using the matched filter.

10. (Original) In a wireless multiple-input multiple-output (MIMO) communication system, a method of deriving eigenvectors used for spatial processing, comprising:

obtaining a plurality of sets of received symbols for a steered reference received via a first link and generated based on a plurality of steering vectors, wherein each of the plurality of sets of received symbols is for a steered reference symbol generated based on one of the plurality of steering vectors;

determining a plurality of scaled vectors based on the plurality of sets of received symbols, wherein each of the plurality of scaled vectors corresponds to a respective one of the plurality of steering vectors; and

deriving a plurality of eigenvectors based on the plurality of scaled vectors, wherein the plurality of eigenvectors are used for matched filtering of data transmission received via the first link.

11. (Original) The method of claim 10, wherein each of the plurality of scaled vectors is determined based on at least one set of received symbols for at least one steered reference symbol generated based on the corresponding steering vector.

12. (Original) The method of claim 10, wherein the plurality of eigenvectors are orthogonal to one another.

13. (Original) The method of claim 12, wherein the deriving includes

performing QR factorization on the plurality of scaled vectors to obtain the plurality of eigenvectors.

14. (Original) The method of claim 12, wherein the deriving includes performing polar decomposition on the plurality of scaled vectors to obtain the plurality of eigenvectors.

15. (Original) The method of claim 12, wherein the deriving includes performing minimum square error computation on the plurality of scaled vectors to obtain the plurality of eigenvectors.

16. (Original) The method of claim 12, further comprising:

estimating singular values based on the plurality of scaled vectors; and

deriving a matched filter for the first link based on the plurality of eigenvectors and the estimated singular values.

17. (Original) The method of claim 12, wherein the plurality of eigenvectors are used for spatial processing for data transmission on a second link.

18. (Original) The method of claim 17, wherein the first link is an uplink and the second link is a downlink in the MIMO communication system.

19. (Original) The method of claim 12, wherein the MIMO communication system utilizes orthogonal frequency division multiplexing (OFDM), and wherein the plurality of eigenvectors are derived for each of a plurality of subbands.

20. (Original) A memory communicatively coupled to a digital signal processing device (DSPD) capable of interpreting digital information to:

determine a plurality of scaled vectors based on a plurality of sets of received symbols for a steered reference generated based on a plurality of steering vectors and received via a first link in a wireless multiple-input multiple-output (MIMO) communication system, wherein each of the plurality of scaled vectors corresponds to a respective one of the plurality of steering vectors; and

derive a plurality of eigenvectors based on the plurality of scaled vectors, wherein the plurality of eigenvectors are suitable for use for spatial processing.

21. (Original) An apparatus in a wireless multiple-input multiple-output (MIMO) communication system, comprising:

a receive spatial processor operative to process a plurality of sets of received symbols for a steered reference to provide a plurality of scaled vectors, wherein the steered reference is received via a first link and generated based on a plurality of steering vectors, and wherein each of the plurality of scaled vectors corresponds to a respective one of the plurality of steering vectors; and

a controller operative to derive a plurality of eigenvectors based on the plurality of scaled vectors, and

wherein the receive spatial processor is further operative to perform matched filtering of a first data transmission received via the first link using the plurality of eigenvectors.

22. (Original) The apparatus of claim 21, wherein the controller is further operative to estimate singular values based on the plurality of scaled vectors and to derive a matched filter for the first link based on the plurality of eigenvectors and the estimated singular values.

23. (Original) The apparatus of claim 21, wherein the plurality of eigenvectors are orthogonal to one another.

24. (Original) The apparatus of claim 23, wherein the controller is operative to perform QR factorization, polar decomposition, or minimum square error computation on the plurality of scaled vectors to obtain the plurality of eigenvectors.

25. (Original) The apparatus of claim 21, further comprising:
a TX spatial processor operative to perform spatial processing for a second data transmission on a second link using the plurality of eigenvectors.

26. (Original) The apparatus of claim 21, wherein the MIMO communication system utilizes orthogonal frequency division multiplexing (OFDM), and wherein the plurality of eigenvectors are derived for each of a plurality of subbands.

27. (Original) An apparatus in a wireless multiple-input multiple-output (MIMO) communication system, comprising:

means for determining a plurality of scaled vectors based on a plurality of sets of received symbols for a steered reference received via a first link and generated based on a plurality of steering vectors, wherein each of the plurality of scaled vectors corresponds to a respective one of the plurality of steering vectors; and

means for deriving a plurality of eigenvectors based on the plurality of scaled vectors, wherein the plurality of eigenvectors are suitable for use for spatial processing.

28. (Original) The apparatus of claim 27, further comprising:

means for performing matched filtering of a first data transmission received via the first link using the plurality of eigenvectors.

29. (Original) The apparatus of claim 27, further comprising:

means for performing spatial processing for a second data transmission on a second link using the plurality of eigenvectors.

30. (Original) The apparatus of claim 27, wherein the plurality of eigenvectors are orthogonal to one another.